Jacob Huebner

ITMD 411-02

Lab 04

5/9/19

HuebDesk Helpdesk - Final Project Report

Description

HuebDesk is a helpdesk application written in Java. The application was built with JavaFX, Gluon Mobile Plugin, Gluon Glisten API, and Java JDBC. The application connects to a MySQL database, and includes fully functional prepared statements for all database operations.

The application includes other features such as SHA256 password hashing, relational table designs, desktop support, mobile support (android and ios), mobile-first design, material design scheme, responsive GUI design, exception handling, inheritance modeling, and full documentation (UML, use cases, etc.). Link to video demonstration here.

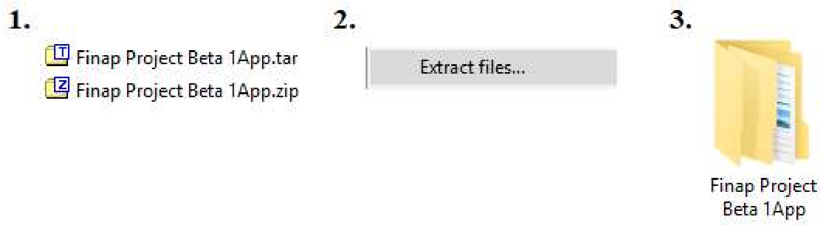
Document Contents

This document is divided into 6 sections.

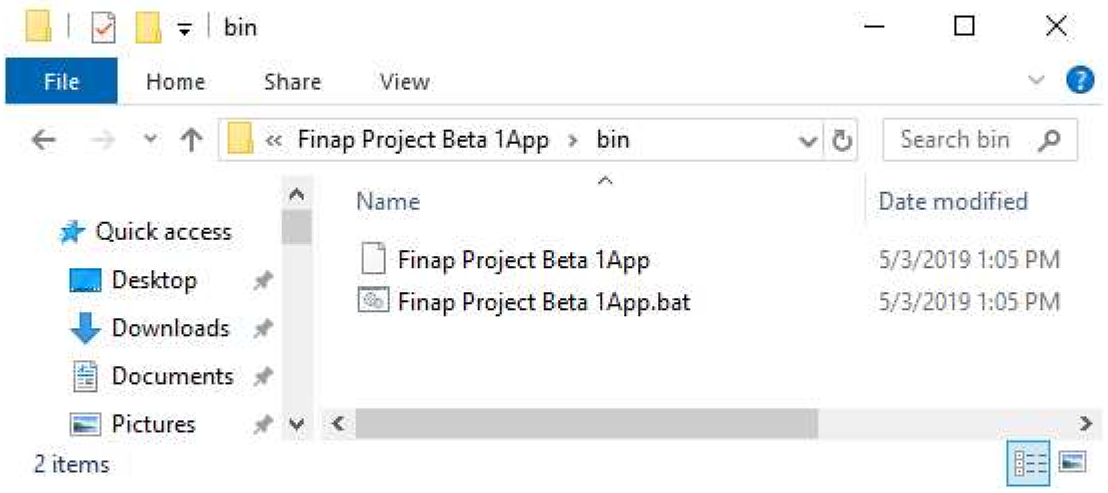
Instructions

How to run HuebDesk

1. First, extract the “final project beta 1App” .tar or .zip file and open it’s contents.



2. Next, open the “bin” directory.



Name	Date modified
Finap Project Beta 1App	5/3/2019 1:05 PM
Finap Project Beta 1App.bat	5/3/2019 1:05 PM

3. Finally, double click “Final Project Beta 1App.bat.

Requirements

1. C**reate database table**: Must create database tables (2 minimum)
2. **Create Java files for interactivity**: At least 1 class for login window and ticket window for both end user and admin. Must feature a rich GUI.
3. **Create a java file for database connectivity / CRUD implementations**: Create files for Java JDBC implementation. The class should perform inserting, updating, deleting, viewing, and closing of desired tickets.
4. **Run your app and snapshot the following runtime work for credit**:
    a. Insert at least 5 tickets into the DB table. *Include a record with your name into the table*.
    b. Update your record by changing your ticket description.
    c. Show a view of your updated ticket.
    d. Delete your ticket form the DB.
    e. Close two existing tickets.
    f. Lastly, show a table view of all of your tickets.
5. **Include the following for credit into Blackboard:**
    a. A doc file of snapshots labeled appropriately. (please provide any login credentials for admin and regular users.
    b. Include a program description
    c. Include a working .jar file of your app
    d. Include a demonstration of your running app.

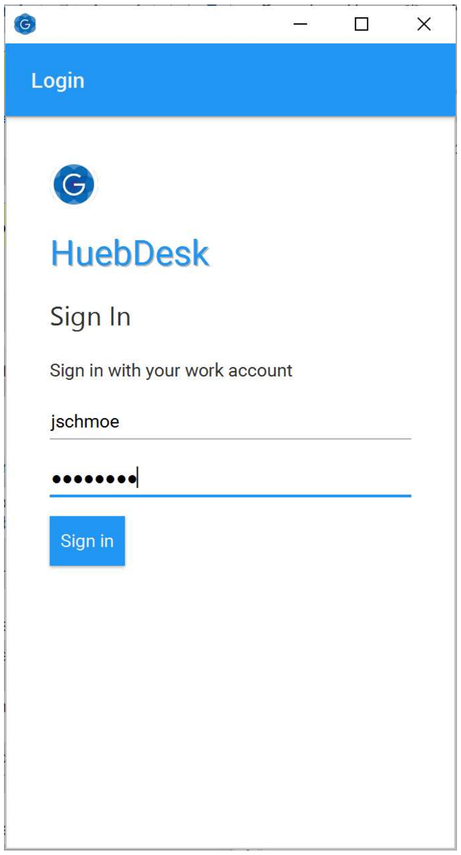
Deliverables

1. CompletedJava application (Archived in a .zip file)
2. Documentation
    a. UML diagram
    b. Use case model
    c. ER model
    d. Relational database model
3. Link to video demonstration
4. .jav file of the java application

Snapshots of Requirements

Snapshot 1 – Insert 5 tickets into the database

1.a Create initial ticket



jschmoe

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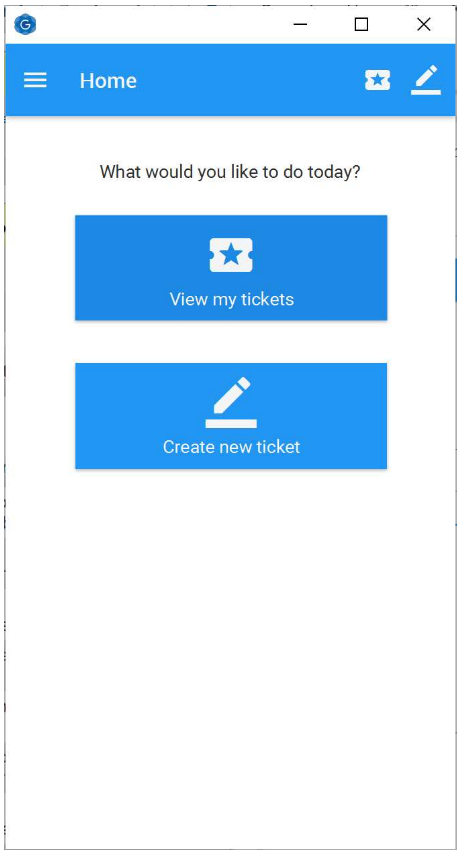
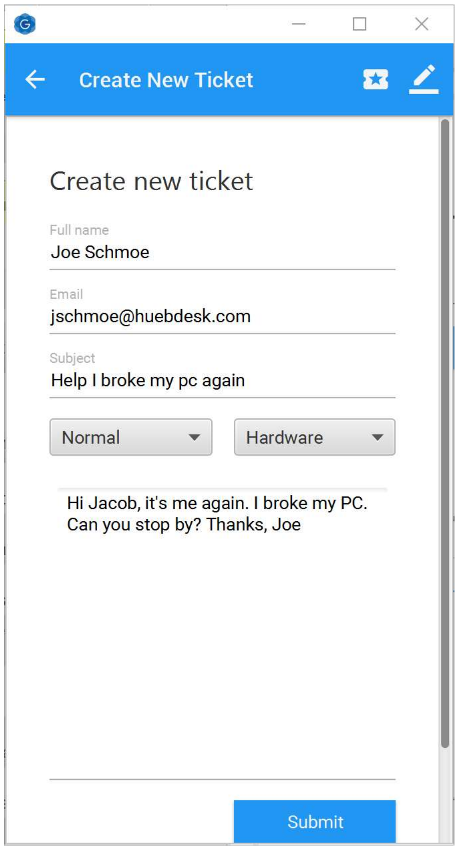




Full name: Joe Schmoe

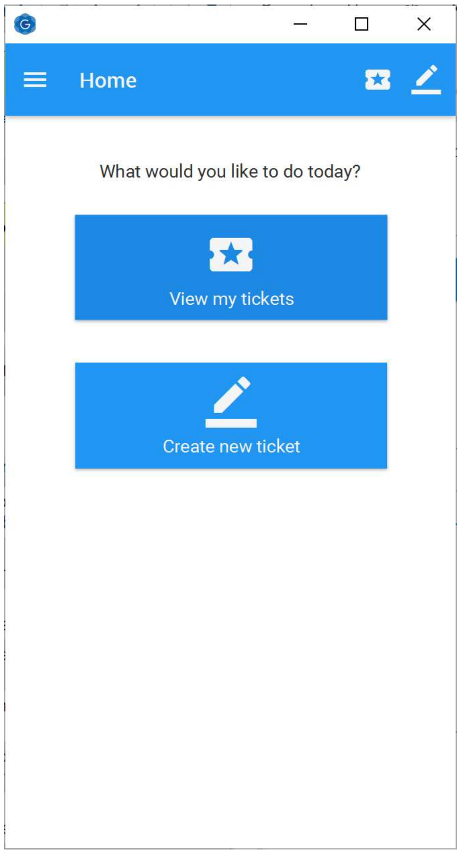
Email: jschmoe@huebdesk.com

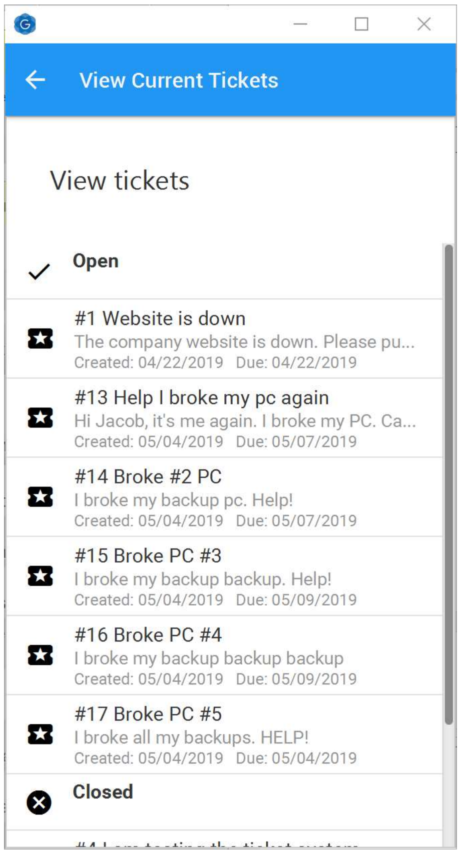
Subject: Help I broke my pc again

Normal | Hardware

Hi Jacob, it's me again. I broke my PC. Can you stop by? Thanks, Joe

1.b Create five more





View tickets

Open

#1 Website is down
The company website is down. Please pu...
Created: 04/22/2019 Due: 04/22/2019

#13 Help I broke my pc again
Hi Jacob, it's me again. I broke my PC. Ca...
Created: 05/04/2019 Due: 05/07/2019

#14 Broke #2 PC
I broke my backup pc. Help!
Created: 05/04/2019 Due: 05/07/2019

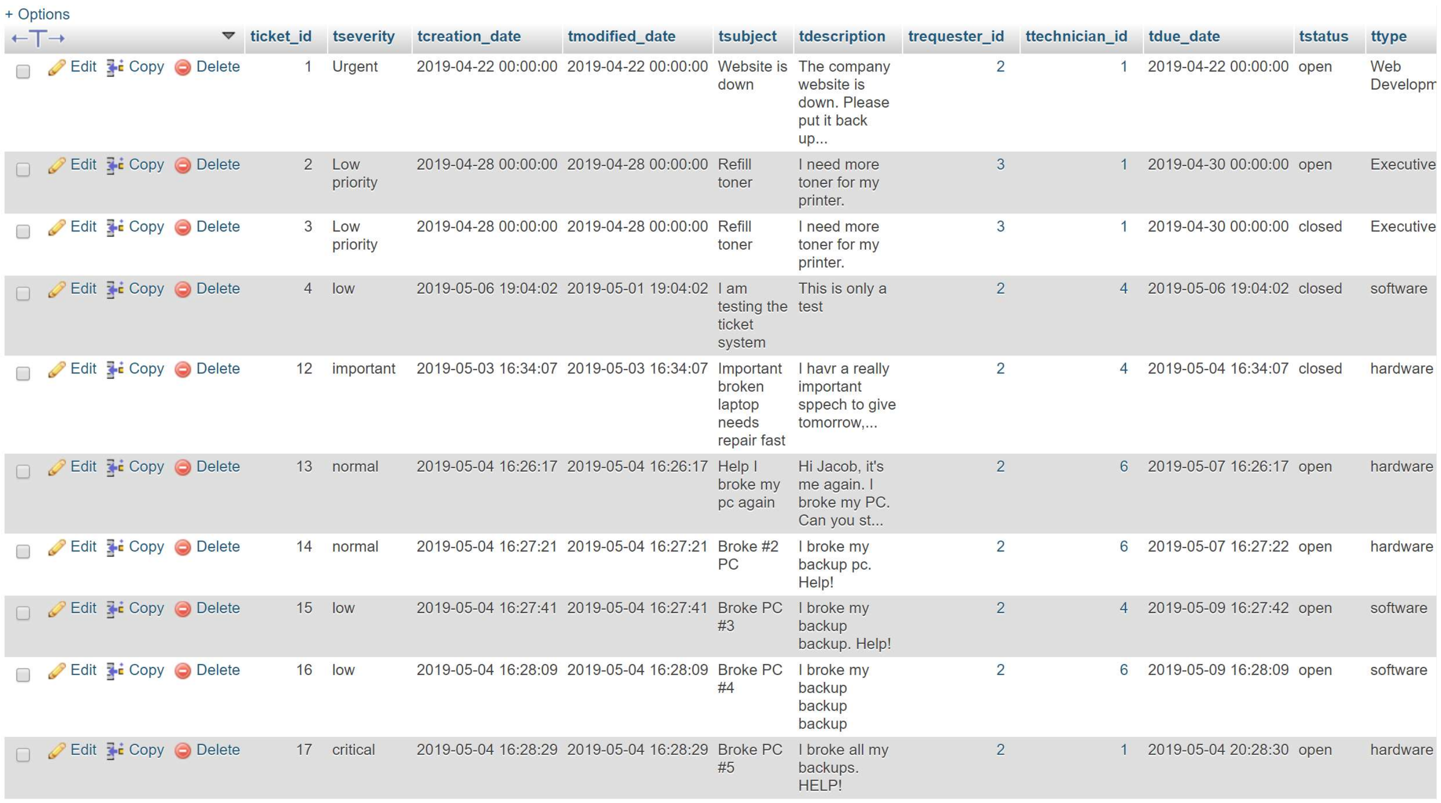
#15 Broke PC #3
I broke my backup backup. Help!
Created: 05/04/2019 Due: 05/09/2019

#16 Broke PC #4
I broke my backup backup backup
Created: 05/04/2019 Due: 05/09/2019

#17 Broke PC #5
I broke all my backups. HELP!
Created: 05/04/2019 Due: 05/04/2019

Closed

1.c Screenshot of database

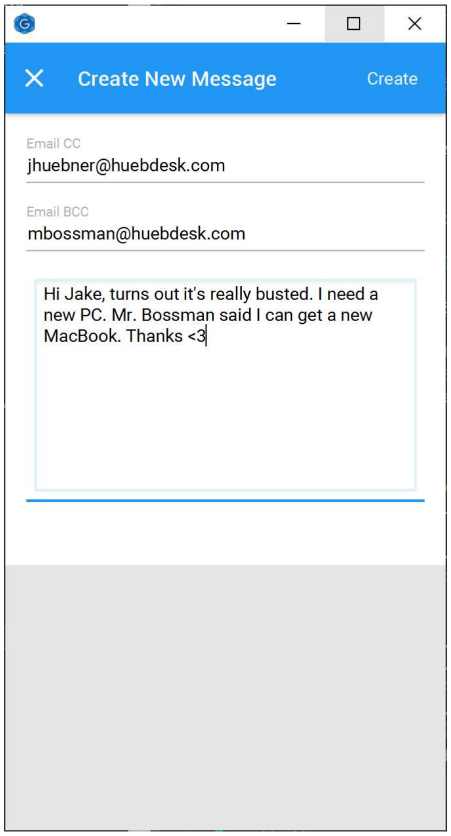


+ Options

	ticket_id	tseverity	tcreation_date	tmodified_date	tsubject	tdescription	trequester_id	ttechnician_id	tdue_date	tstatus	ttype
Edit Copy Delete	1	Urgent	2019-04-22 00:00:00	2019-04-22 00:00:00	Website is down	The company website is down. Please put it back up...	2	1	2019-04-22 00:00:00	open	Web Developm
Edit Copy Delete	2	Low priority	2019-04-28 00:00:00	2019-04-28 00:00:00	Refill toner	I need more toner for my printer.	3	1	2019-04-30 00:00:00	open	Executive
Edit Copy Delete	3	Low priority	2019-04-28 00:00:00	2019-04-28 00:00:00	Refill toner	I need more toner for my printer.	3	1	2019-04-30 00:00:00	closed	Executive
Edit Copy Delete	4	low	2019-05-06 19:04:02	2019-05-01 19:04:02	I am testing the ticket system	This is only a test	2	4	2019-05-06 19:04:02	closed	software
Edit Copy Delete	12	important	2019-05-03 16:34:07	2019-05-03 16:34:07	Important broken laptop needs repair fast	I havr a really important sppech to give tomorrow,...	2	4	2019-05-04 16:34:07	closed	hardware
Edit Copy Delete	13	normal	2019-05-04 16:26:17	2019-05-04 16:26:17	Help I broke my pc again	Hi Jacob, it's me again. I broke my PC. Can you st...	2	6	2019-05-07 16:26:17	open	hardware
Edit Copy Delete	14	normal	2019-05-04 16:27:21	2019-05-04 16:27:21	Broke #2 PC	I broke my backup pc. Help!	2	6	2019-05-07 16:27:22	open	hardware
Edit Copy Delete	15	low	2019-05-04 16:27:41	2019-05-04 16:27:41	Broke PC #3	I broke my backup backup. Help!	2	4	2019-05-09 16:27:42	open	software
Edit Copy Delete	16	low	2019-05-04 16:28:09	2019-05-04 16:28:09	Broke PC #4	I broke my backup backup backup	2	6	2019-05-09 16:28:09	open	software
Edit Copy Delete	17	critical	2019-05-04 16:28:29	2019-05-04 16:28:29	Broke PC #5	I broke all my backups. HELP!	2	1	2019-05-04 20:28:30	open	hardware

Snapshot 2 – Update your record by changing your ticket description.

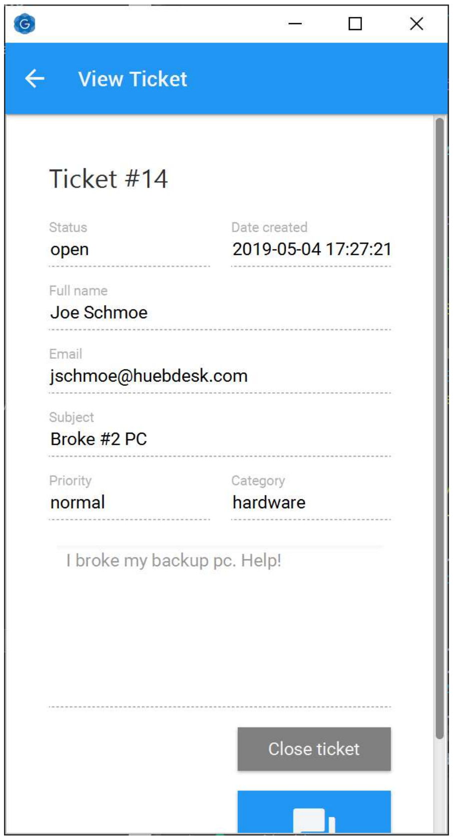
2.a Updating ticket (creates note and adds it to ticket)



Email CC
jhuebner@huebdesk.com

Email BCC
mbossman@huebdesk.com

Hi Jake, turns out it's really busted. I need a new PC. Mr. Bossman said I can get a new MacBook. Thanks <3



Ticket #14

Status	Date created
open	2019-05-04 17:27:21

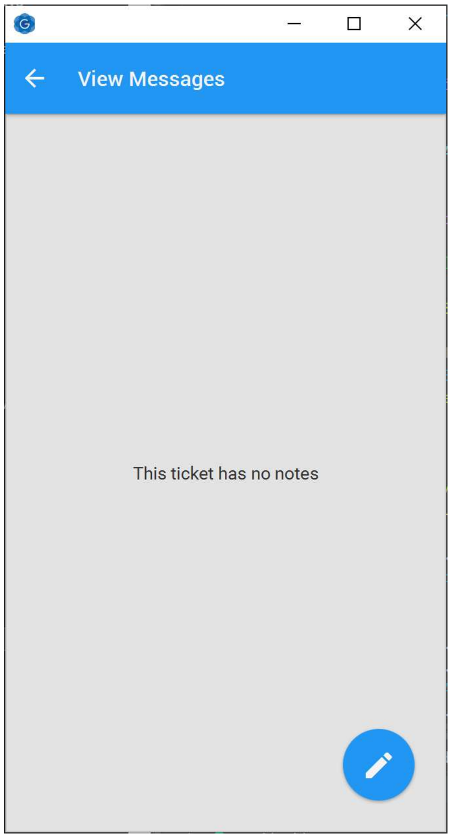
Full name
Joe Schmoe

Email
jschmoe@huebdesk.com

Subject
Broke #2 PC

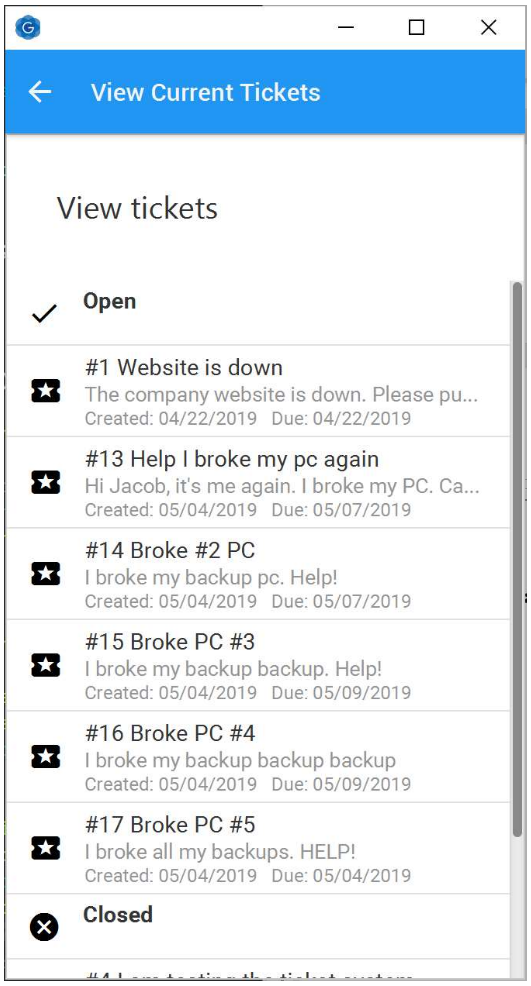
Priority	Category
normal	hardware

I broke my backup pc. Help!



This ticket has no notes

2.b Creating note and viewing new note



View tickets

Open

#1 Website is down
The company website is down. Please pu...
Created: 04/22/2019 Due: 04/22/2019

#13 Help I broke my pc again
Hi Jacob, it's me again. I broke my PC. Ca...
Created: 05/04/2019 Due: 05/07/2019

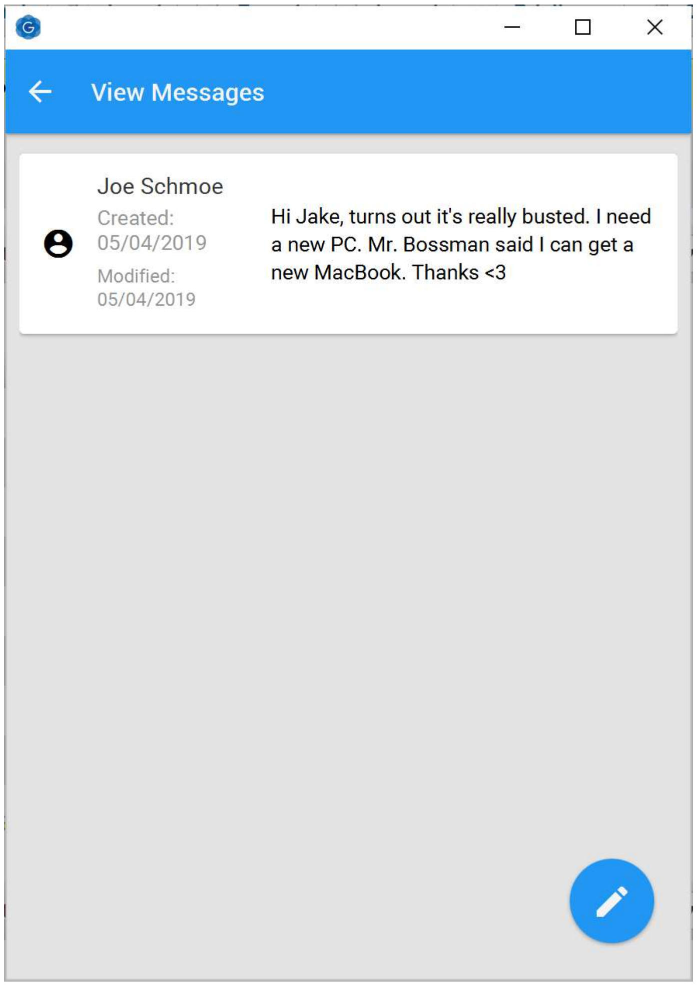
#14 Broke #2 PC
I broke my backup pc. Help!
Created: 05/04/2019 Due: 05/07/2019

#15 Broke PC #3
I broke my backup backup. Help!
Created: 05/04/2019 Due: 05/09/2019

#16 Broke PC #4
I broke my backup backup backup
Created: 05/04/2019 Due: 05/09/2019

#17 Broke PC #5
I broke all my backups. HELP!
Created: 05/04/2019 Due: 05/04/2019

Closed



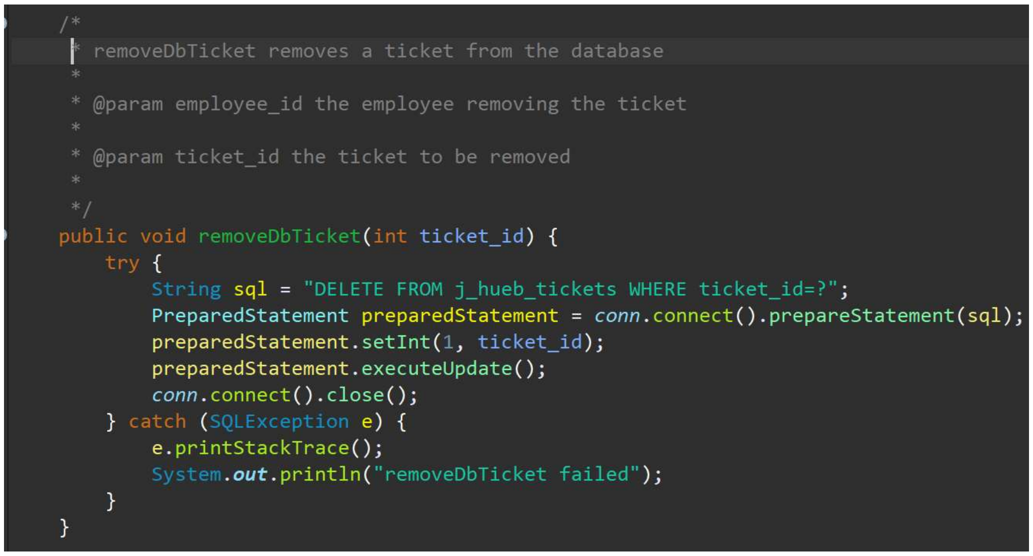
Joe Schmoe
Created: 05/04/2019
Modified: 05/04/2019

Hi Jake, turns out it's really busted. I need a new PC. Mr. Bossman said I can get a new MacBook. Thanks <3

Snapshot 3 – Delete your ticket form the DB.

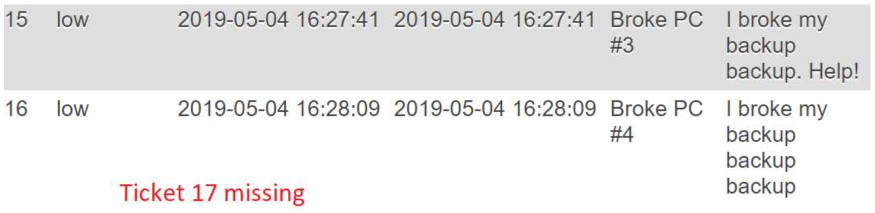
Deleting tickets from a database does not follow best practices. Ideally, all tickets should be retained. But there is functionality to delete a ticket, but the button has been left out of the build.

3.a Code to delete ticket



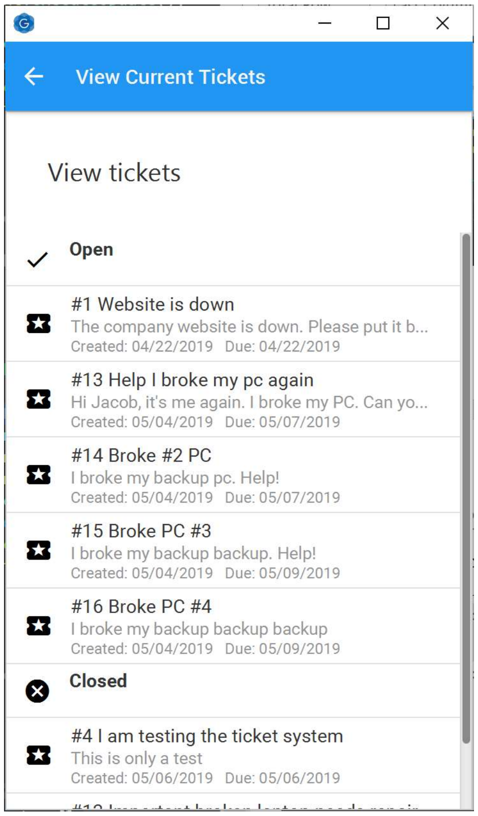
```
/*
 * removeDbTicket removes a ticket from the database
 *
 * @param employee_id the employee removing the ticket
 *
 * @param ticket_id the ticket to be removed
 *
 */
public void removeDbTicket(int ticket_id) {
    try {
        String sql = "DELETE FROM j_hueb_tickets WHERE ticket_id=?";
        PreparedStatement preparedStatement = conn.connect().prepareStatement(sql);
        preparedStatement.setInt(1, ticket_id);
        preparedStatement.executeUpdate();
        conn.connect().close();
    } catch (SQLException e) {
        e.printStackTrace();
        System.out.println("removeDbTicket failed");
    }
}
```

3.b Result on execution



15	low	2019-05-04 16:27:41	2019-05-04 16:27:41	Broke PC #3	I broke my backup backup. Help!
16	low	2019-05-04 16:28:09	2019-05-04 16:28:09	Broke PC #4	I broke my backup backup backup

Ticket 17 missing



View Current Tickets

View tickets

Open

#1 Website is down
The company website is down. Please put it b...
Created: 04/22/2019 Due: 04/22/2019

#13 Help I broke my pc again
Hi Jacob, it's me again. I broke my PC. Can yo...
Created: 05/04/2019 Due: 05/07/2019

#14 Broke #2 PC
I broke my backup pc. Help!
Created: 05/04/2019 Due: 05/07/2019

#15 Broke PC #3
I broke my backup backup. Help!
Created: 05/04/2019 Due: 05/09/2019

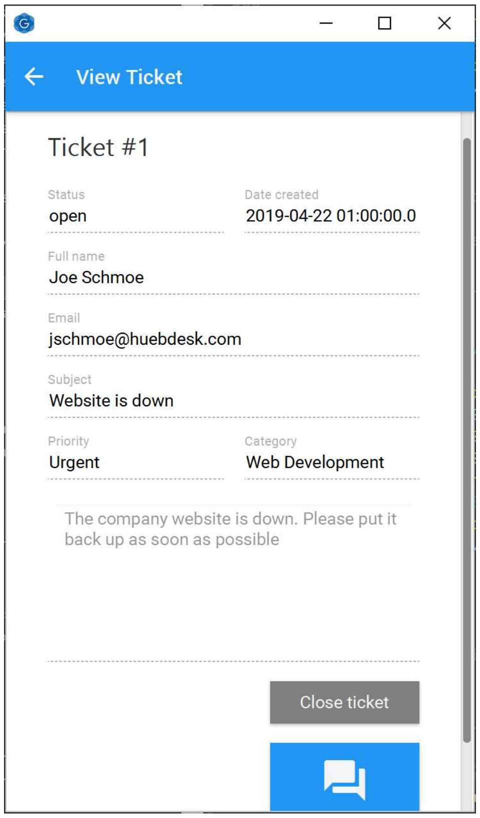
#16 Broke PC #4
I broke my backup backup backup
Created: 05/04/2019 Due: 05/09/2019

Closed

#4 I am testing the ticket system
This is only a test
Created: 05/06/2019 Due: 05/06/2019

Snapshot 4 – Close two existing tickets

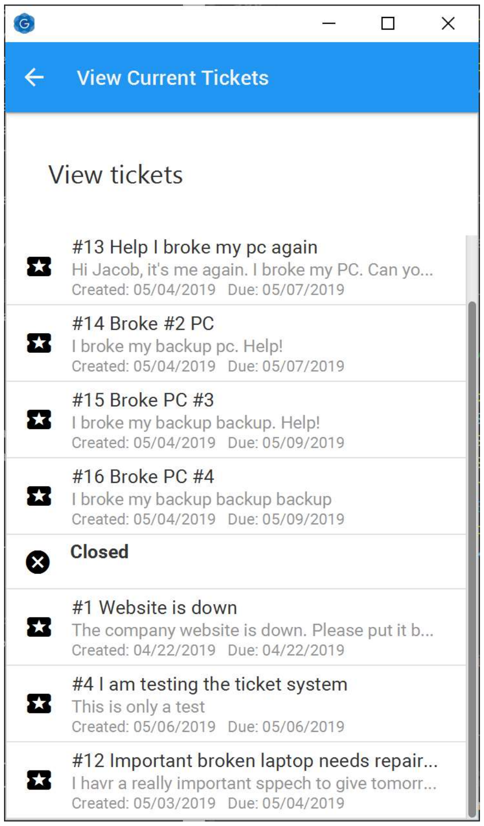
4.a – Closing two tickets


View Ticket

Ticket #1

Status: open
Date created: 2019-04-22 01:00:00.0
Full name: Joe Schmoe
Email: jschmoe@huebdesk.com
Subject: Website is down
Priority: Urgent
Category: Web Development

The company website is down. Please put it back up as soon as possible


View Current Tickets

View tickets

#13 Help I broke my pc again
Hi Jacob, it's me again. I broke my PC. Can yo...
Created: 05/04/2019 Due: 05/07/2019

#14 Broke #2 PC
I broke my backup pc. Help!
Created: 05/04/2019 Due: 05/07/2019

#15 Broke PC #3
I broke my backup backup. Help!
Created: 05/04/2019 Due: 05/09/2019

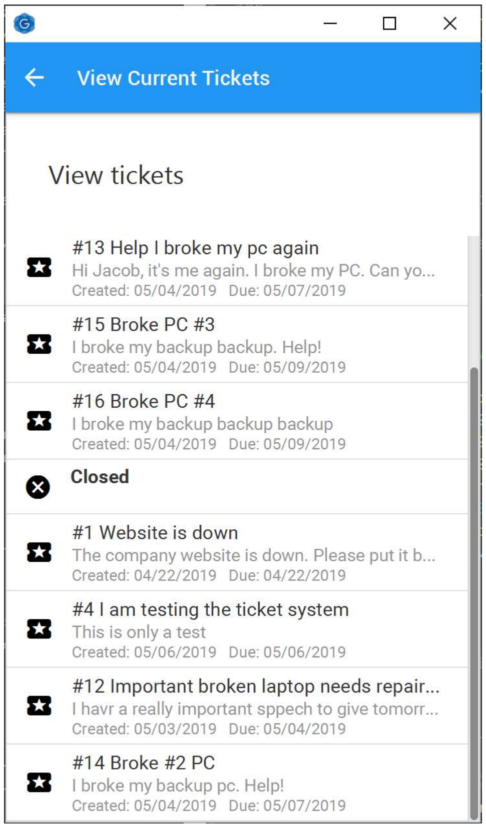
#16 Broke PC #4
I broke my backup backup backup
Created: 05/04/2019 Due: 05/09/2019

Closed

#1 Website is down
The company website is down. Please put it b...
Created: 04/22/2019 Due: 04/22/2019

#4 I am testing the ticket system
This is only a test
Created: 05/06/2019 Due: 05/06/2019

#12 Important broken laptop needs repair...
I havr a really important sppech to give tomorr...
Created: 05/03/2019 Due: 05/04/2019


View Current Tickets

View tickets

#13 Help I broke my pc again
Hi Jacob, it's me again. I broke my PC. Can yo...
Created: 05/04/2019 Due: 05/07/2019

#15 Broke PC #3
I broke my backup backup. Help!
Created: 05/04/2019 Due: 05/09/2019

#16 Broke PC #4
I broke my backup backup backup
Created: 05/04/2019 Due: 05/09/2019

Closed

#1 Website is down
The company website is down. Please put it b...
Created: 04/22/2019 Due: 04/22/2019

#4 I am testing the ticket system
This is only a test
Created: 05/06/2019 Due: 05/06/2019

#12 Important broken laptop needs repair...
I havr a really important sppech to give tomorr...
Created: 05/03/2019 Due: 05/04/2019

#14 Broke #2 PC
I broke my backup pc. Help!
Created: 05/04/2019 Due: 05/07/2019

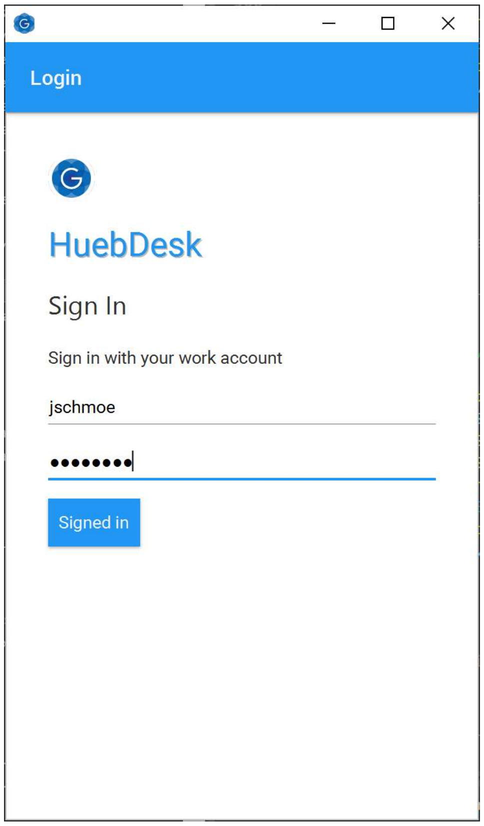
Snapshot 5 – Show a table view of all of your tickets.

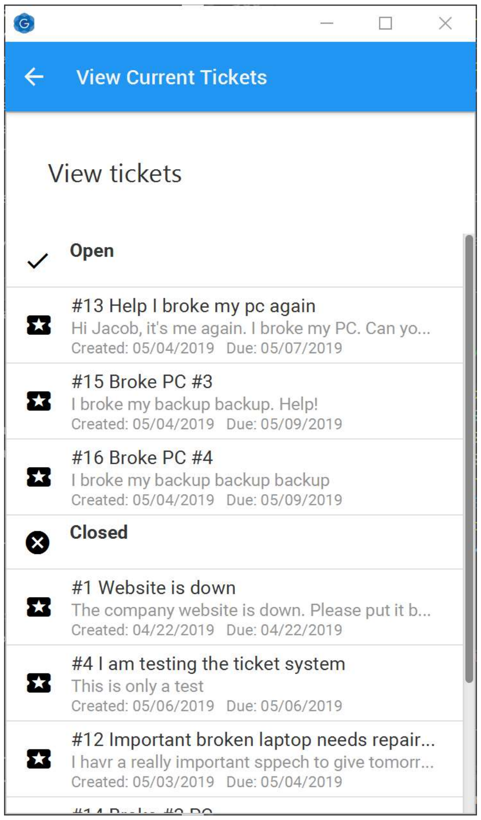
1.a – Normal User view (only user tickets)

User credentials (case-sensitive)

Username: jschmoe

Password: password





#13 Help I broke my pc again
Hi Jacob, it's me again. I broke my PC. Can yo...
Created: 05/04/2019 Due: 05/07/2019

#15 Broke PC #3
I broke my backup backup. Help!
Created: 05/04/2019 Due: 05/09/2019

#16 Broke PC #4
I broke my backup backup backup
Created: 05/04/2019 Due: 05/09/2019

#1 Website is down
The company website is down. Please put it b...
Created: 04/22/2019 Due: 04/22/2019

#4 I am testing the ticket system
This is only a test
Created: 05/06/2019 Due: 05/06/2019

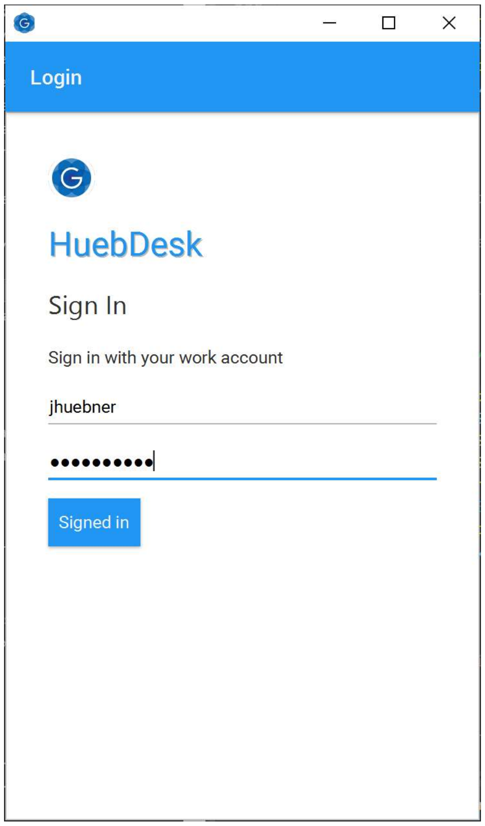
#12 Important broken laptop needs repair...
I havr a really important sppech to give tomorr...
Created: 05/03/2019 Due: 05/04/2019

1.b – Admin view (All user tickets)

User credentials (case-sensitive)

Username: jhuebner

Password: ILoveBears



Login

HuebDesk

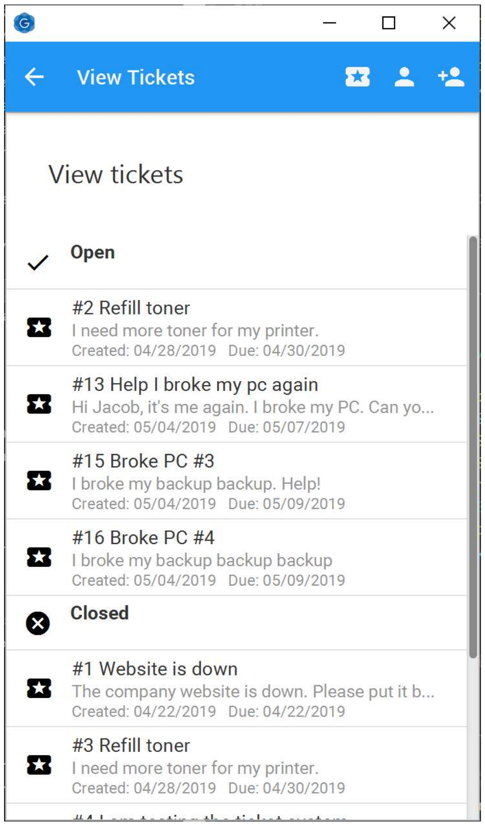
Sign In

Sign in with your work account

jhuebner

••••••••••

Signed in



View Tickets

View tickets

Open

#2 Refill toner
I need more toner for my printer.
Created: 04/28/2019 Due: 04/30/2019

#13 Help I broke my pc again
Hi Jacob, it's me again. I broke my PC. Can yo...
Created: 05/04/2019 Due: 05/07/2019

#15 Broke PC #3
I broke my backup backup. Help!
Created: 05/04/2019 Due: 05/09/2019

#16 Broke PC #4
I broke my backup backup backup
Created: 05/04/2019 Due: 05/09/2019

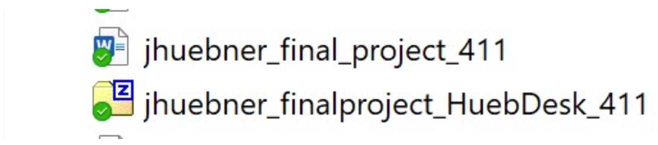
Closed

#1 Website is down
The company website is down. Please put it b...
Created: 04/22/2019 Due: 04/22/2019

#3 Refill toner
I need more toner for my printer.
Created: 04/28/2019 Due: 04/30/2019

Snapshots of Deliverables

Snapshot 1 – Completed java application (Archived in a .zip file)



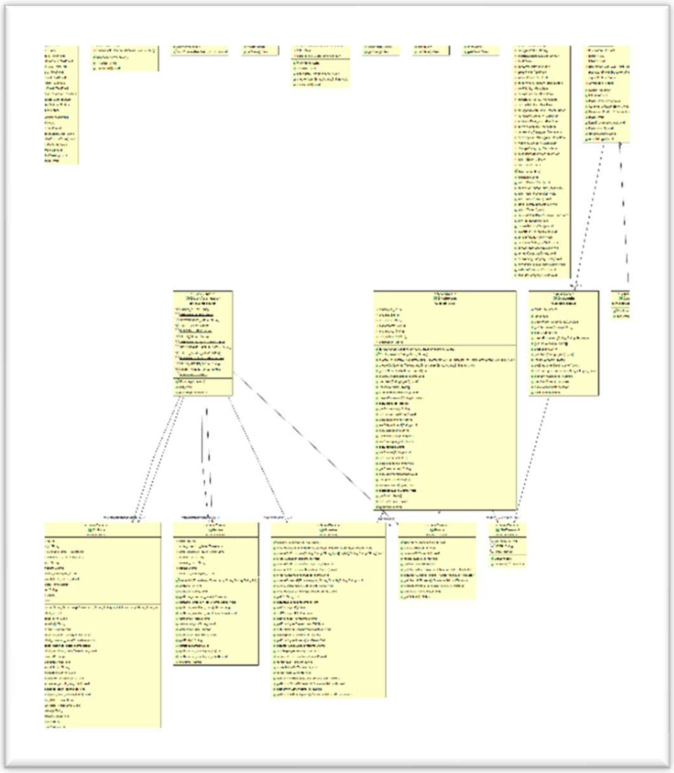
jhuebner_final_project_411

jhuebner_finalproject_HuebDesk_411

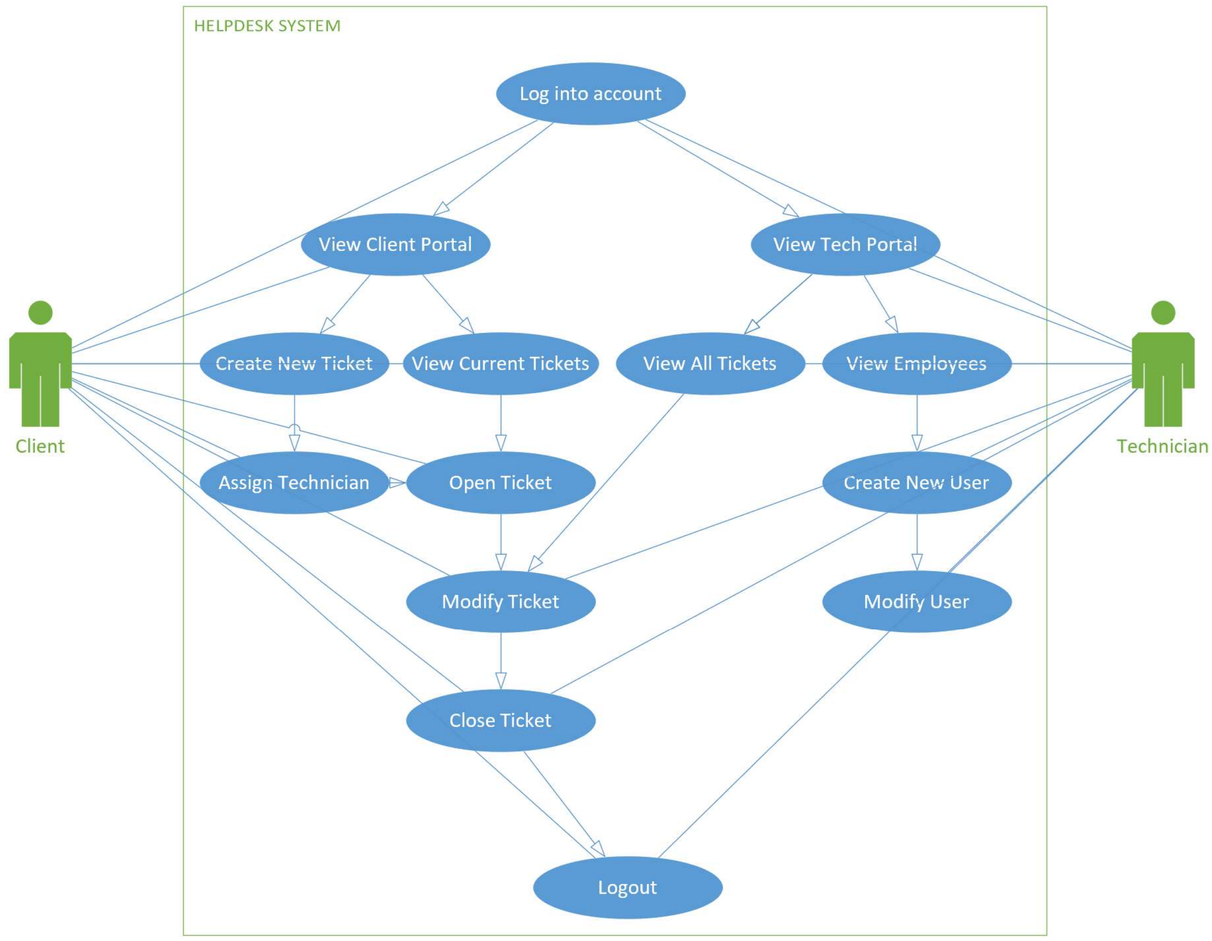
Snapshot 2 – Documentation

2.a – UML diagram

The image is too big for this document. To see the full image, open the “UML Map.jpg" included in this submission. The UML map is also located in the java archive file under “…/Doc1/UML Map”

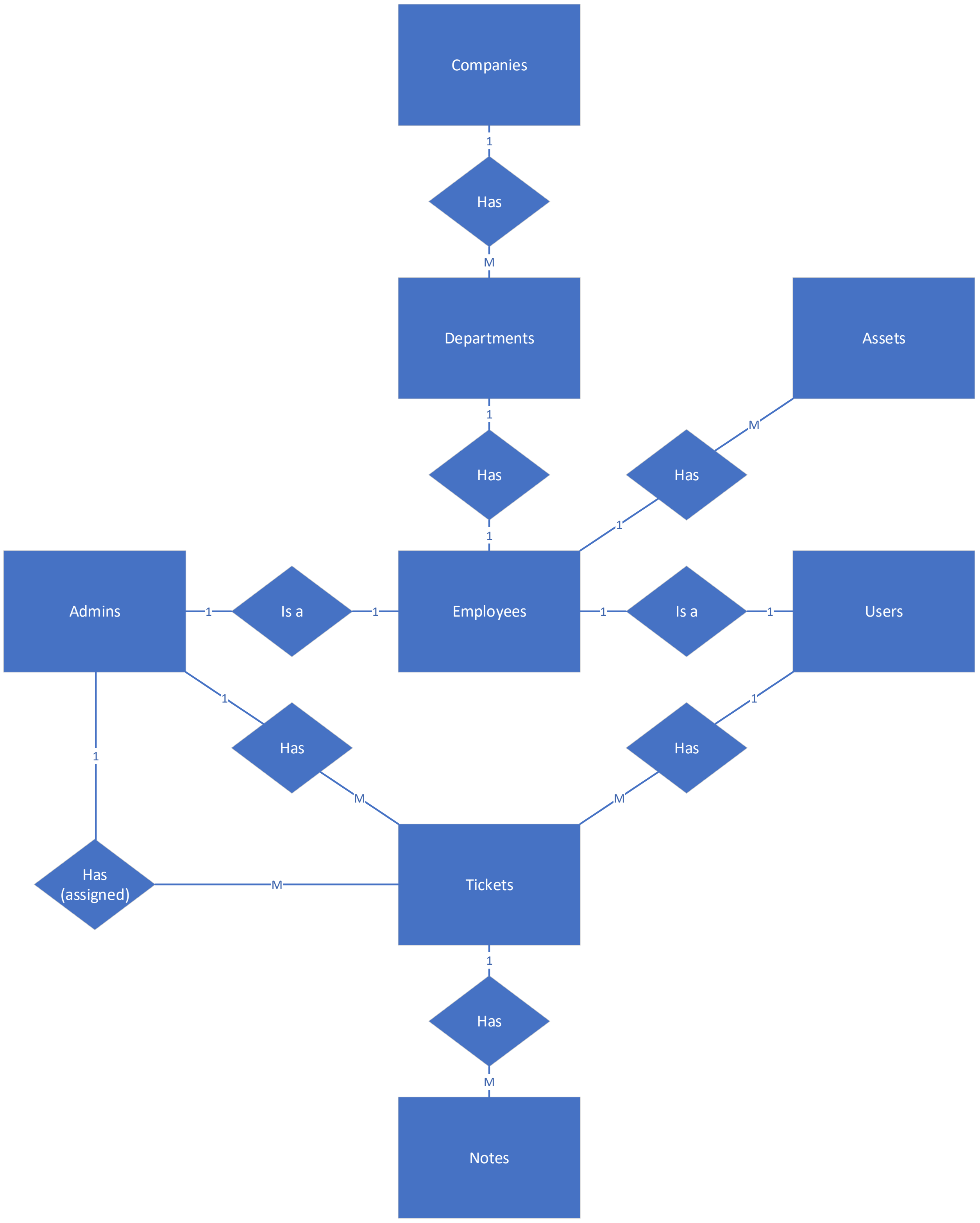


2.b – Use case model



2.c – ER model

Only half of this ER model is implemented in current build.



2.d – Relational database model

Database structure

j_hueb_companies

Company ID	C Name	CEO_ID	C Location

j_hueb_companydepartments

Company ID	Department ID

j_hueb_departments

Department ID	D Name	D Manager_ID	D Location

j_hueb_departmentemployees

Department ID	Employee ID

J_hueb_employeemanagers

Employee ID	Manager ID

j_hueb_employees

Employee ID	E Name	E Location	E Username	E Password	E Salt

J_hueb_employeeassets

Employee ID	Asset ID

j_hueb_assets

Asset ID	A Order date	A Invoice ID	A Type	A Value	A Vendor	A Model

j_hueb_tickets

Ticket ID	T Severity	T Creation date	T Modified date	T Subject	T Description	T Requester Employee_ID	T Assigned Admin ID	Due date	T Status	T Type	T Level

j_hueb_ticketnotes

Ticket ID	Note ID

j_hueb_notes

Note ID	Note Creation date	Note Modified date	N Email CC	N Email BCC	N Body	N Author Employee ID

User privileges

j_hueb_userroles

Employee ID	Role ID

j_hueb_roles

Role ID	Role name

Constraints & Assumptions

- All Employees must have a one role.
- All Employees can only be assigned to one department, and to one manager.
- Company, Department, and Manager can be null.
- A company exists, a department exists, and a CEO employee exists.
- If no tech is specified, a technician will automatically be assigned.
- The requestor is set as the person who created the ticket
- At least one CC email is automatically entered, and it is the original user assigned.

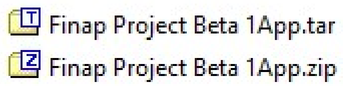
Snapshot 3 – Link to video demonstration

Link the video below:

https://youtu.be/AX1QnLYC_o0

Snapshot 4 – .Jar file for java application

This application is stored as a .zip/.tar file because it has multiple .jar files. Both files have been included in this submission.



Finap Project Beta 1App.tar
Finap Project Beta 1App.zip

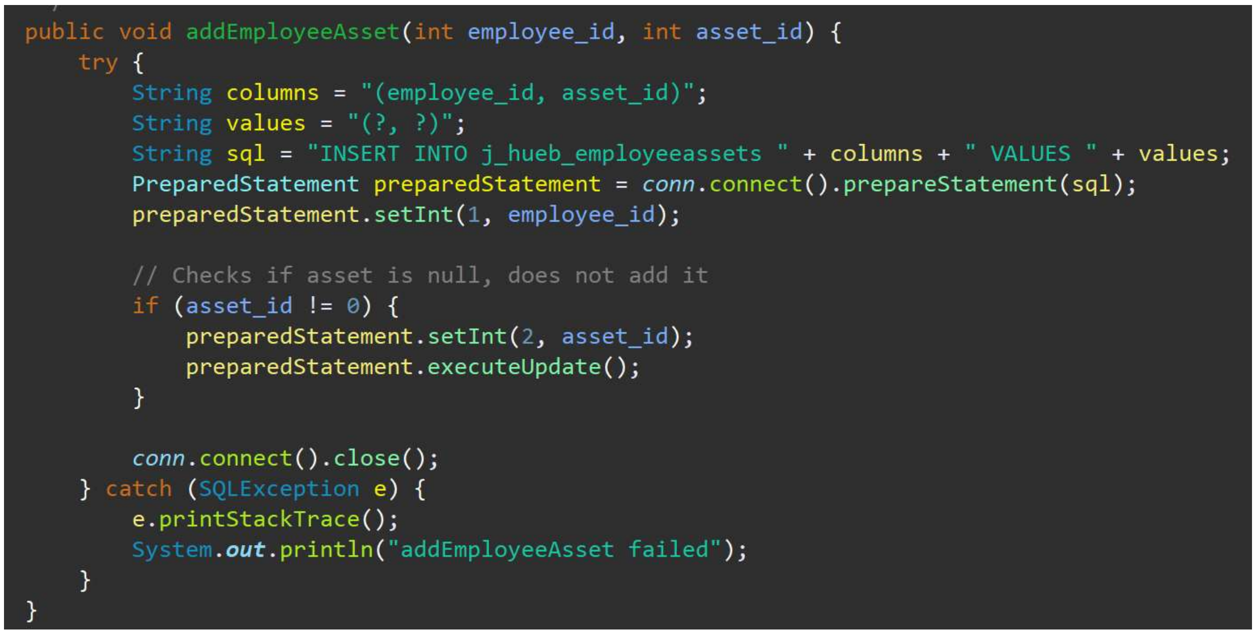
Snapshots of Extra Credit

Extra Credit 1 – JavaFX

The app is completely built in JavaFX.

Extra Credit 2 – Prepared Statements

All SQL statements are made using prepared statements



```
public void addEmployeeAsset(int employee_id, int asset_id) {
    try {
        String columns = "(employee_id, asset_id)";
        String values = "(?, ?)";
        String sql = "INSERT INTO j_hueb_employeeassets " + columns + " VALUES " + values;
        PreparedStatement preparedStatement = conn.connect().prepareStatement(sql);
        preparedStatement.setInt(1, employee_id);

        // Checks if asset is null, does not add it
        if (asset_id != 0) {
            preparedStatement.setInt(2, asset_id);
            preparedStatement.executeUpdate();
        }

        conn.connect().close();
    } catch (SQLException e) {
        e.printStackTrace();
        System.out.println("addEmployeeAsset failed");
    }
}
```

Extra Credit 3 – Relational Table Designs

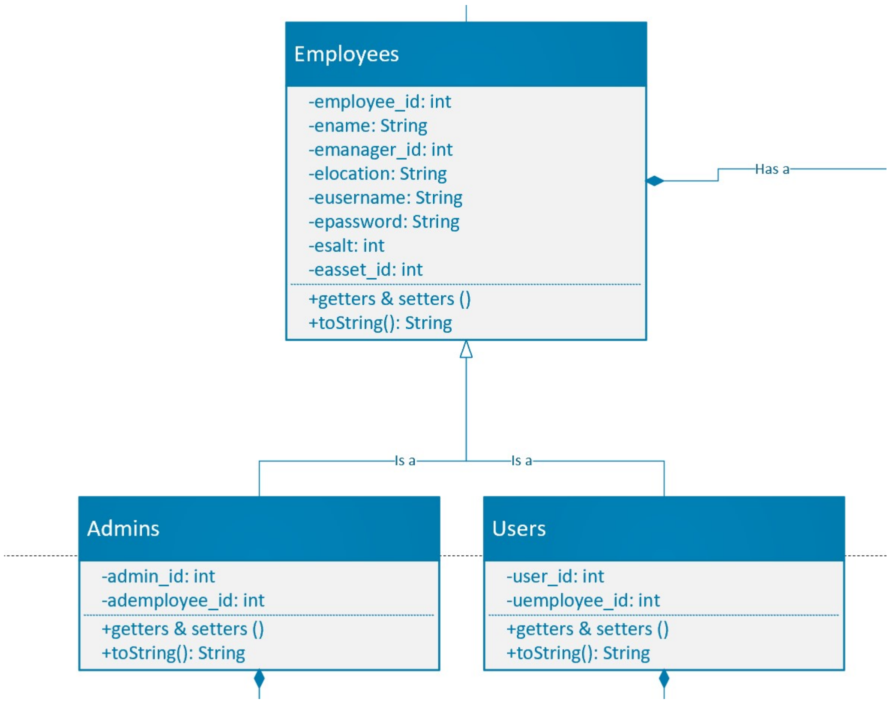
(See Devilerable Snapshot 2.d)

Extra Credit 4 – Entity, UML, Use cases

(See Devilerable Snapshot 2.a, 2.b, 2.c)

Extra Credit 5 – Inheritance modeling

Inheritance can be seen in the Employee class. There are two types of users, "users" and "admins". Both inherit the employee class. Admins and employees share some functions like logging in.



Extra Credit 6 – Password hashing (My favorite)

I did not store plain text passwords. Instead, I salted and hashed the passwords with SHA256.

First, I converted the plaintext password to a byte array

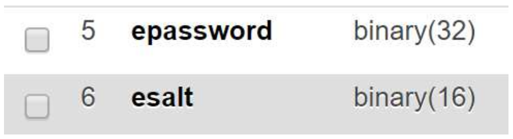
Next, I generated "salt" using Java SecureRandom

After that, I added the salt to the password.

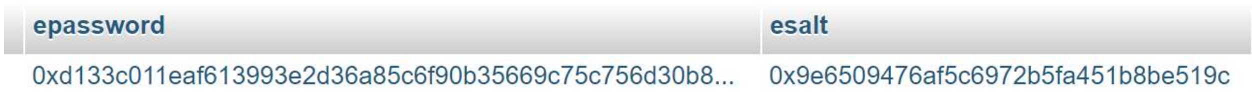
Finally, I used Java MessageDigest (specifying "SHA256") to hash the password.

Here is what the result looks like in the database:

This is the datatype of the password and salt. As you can see, the password is 32 bytes (or 256 bits. Hence "SHA256"). I could have generated any size salt so I went with16 bytes.



☐	5	**epassword**	binary(32)
☐	6	**esalt**	binary(16)



epassword	esalt
0xd133c011eaf613993e2d36a85c6f90b35669c75c756d30b8...	0x9e6509476af5c6972b5fa451b8be519c

Here is the code I used. It goes

1. getHash()
2. makeSafeSalt()

getHash()

```

	/*
	 * getHash returns a hashed version of any password given
	 * the password string and a salt
	 *
	 * @param password the password to be hashed
	 *
	 * @param salt the salt to be added to the hash
```

```
     *
     * @return hashresult the resulting SHA-256 hash
     *
     */
    public byte[] getHash(String password, byte[] salt) {
        byte[] hashresult = null;

        // Attempt to hash password
        try {
            // Create SHA-256 message digest
            MessageDigest md = MessageDigest.getInstance("SHA-256");

            // Pass the salt to the digest for computation
            md.update(salt);

            // Generate the hash for the salted password
            hashresult =
md.digest(password.getBytes(StandardCharsets.UTF_8));

        } catch (NoSuchAlgorithmException e) {
            System.out.println("getHash failed");
            e.printStackTrace();
        }

        return hashresult;
    }

```

makeSafeSalt()

```
    /*
     * makeSafeSalt return a new secure random salt
     *
     * @return salt the new salt
     */
    public byte[] makeSafeSalt() {
        byte[] salt = null;

        // Generate random salt
        try {
        SecureRandom random = new SecureRandom();
        salt = new byte[16];
        random.nextBytes(salt);
        }
        catch(Exception e) {
            System.out.println("makeSafeSalt failed");
            e.printStackTrace();
        }

        return salt;
     }
```

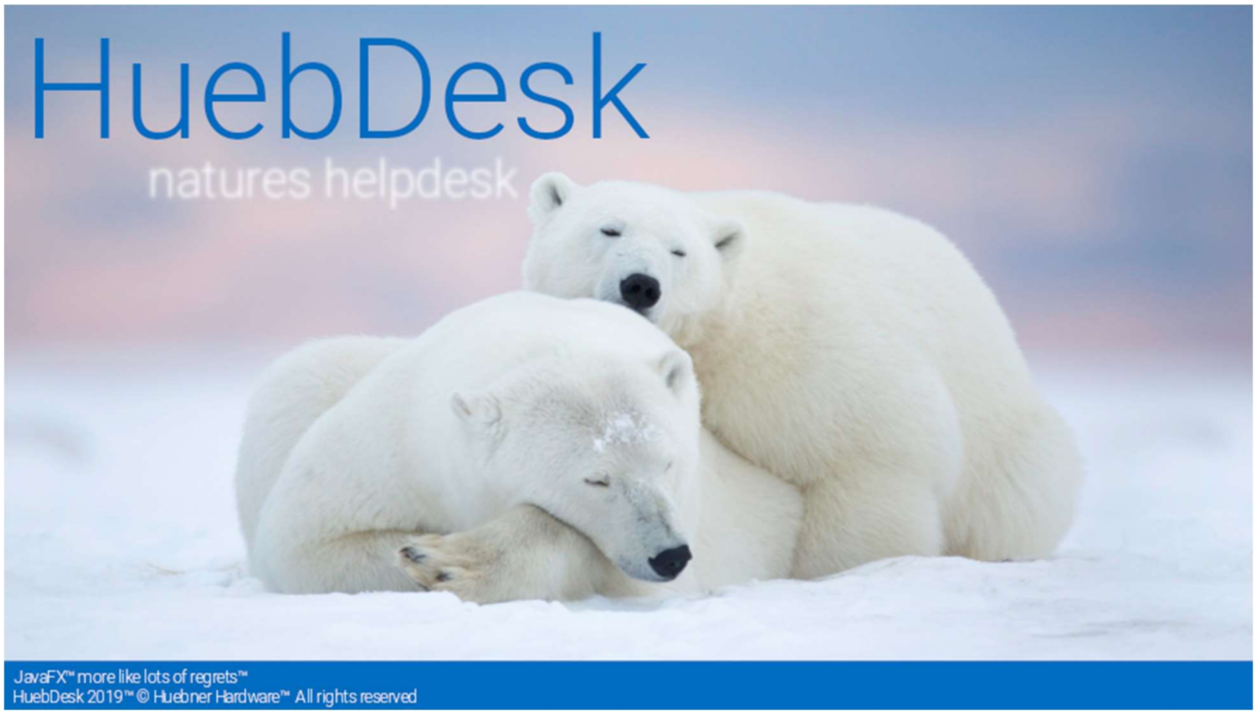
Extra Credit 7 – HuebDesk Brand Resources

By using the HuebDesk trademark, you agree to follow these Guidelines as well as our Terms of Service and all other rules and policies:

- Primary color must be #006cc1
- The 'H' and 'D' in HuebDesk must be capitalized
- All advertising must feature Bears (excluding scenic landscapes)

I <u>WILL</u> find you if I find any "advertisements without bears" and yes this <u>IS</u> a written threat.

Official Branding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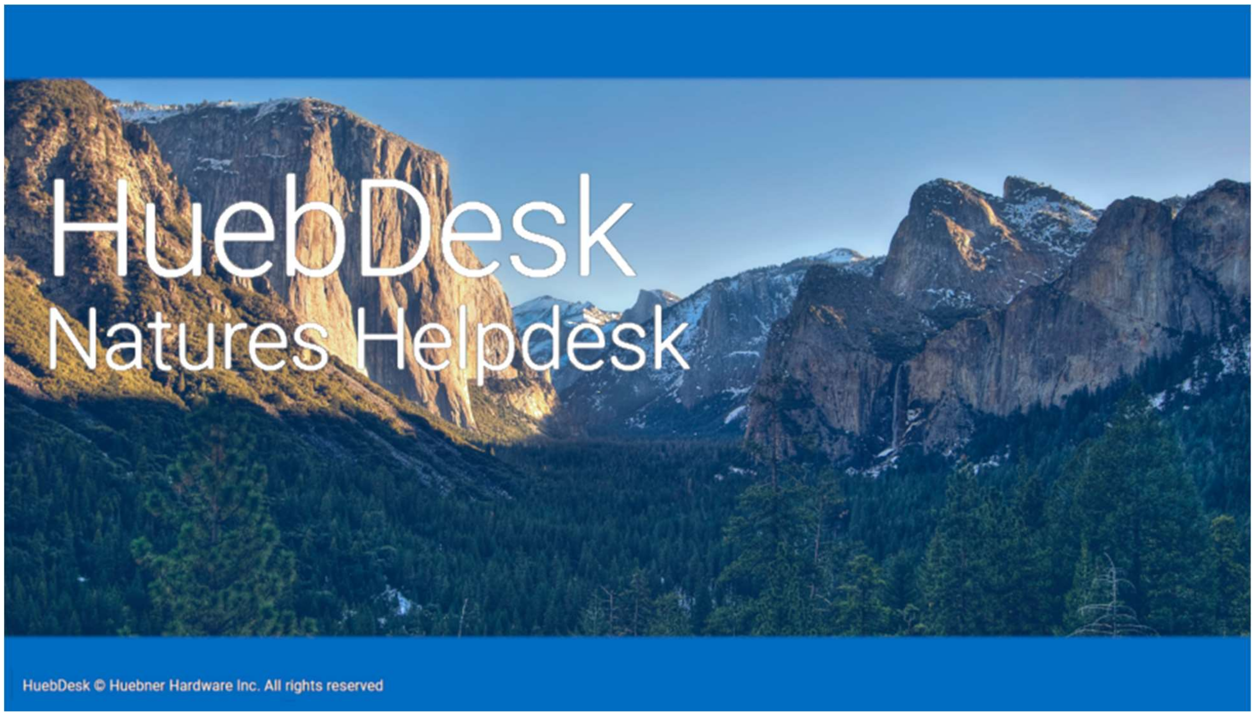
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Natures Helpdesk
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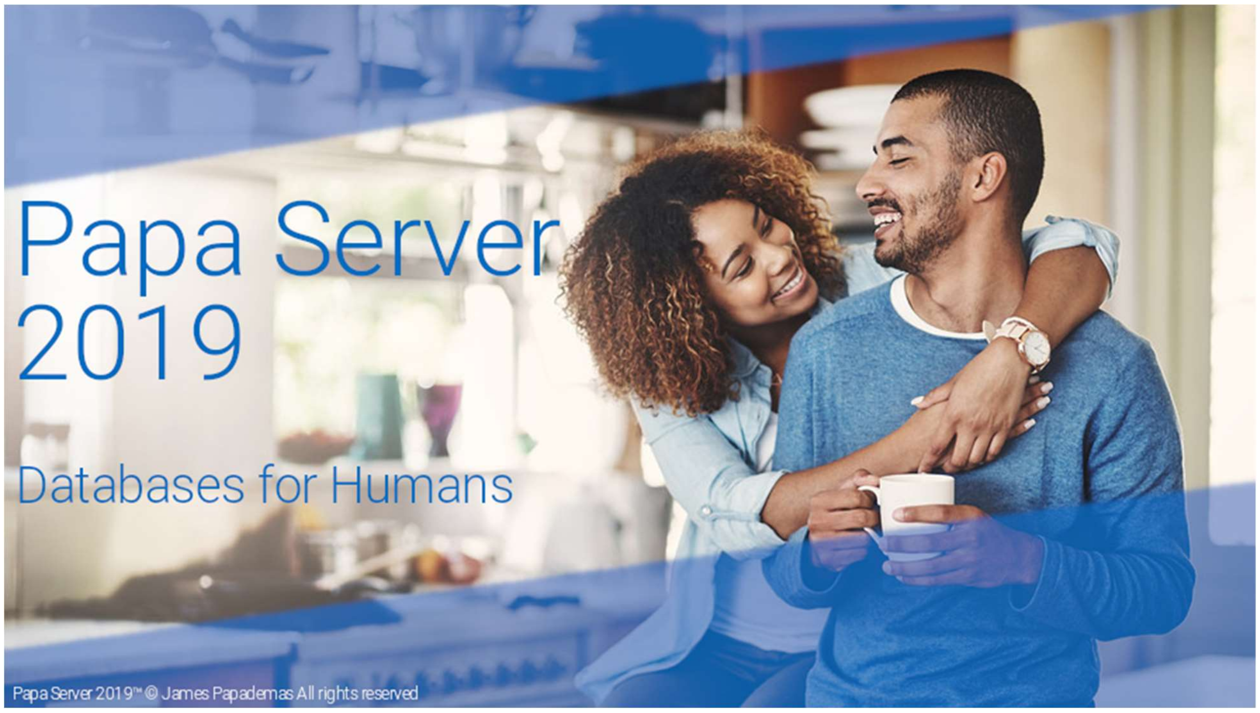
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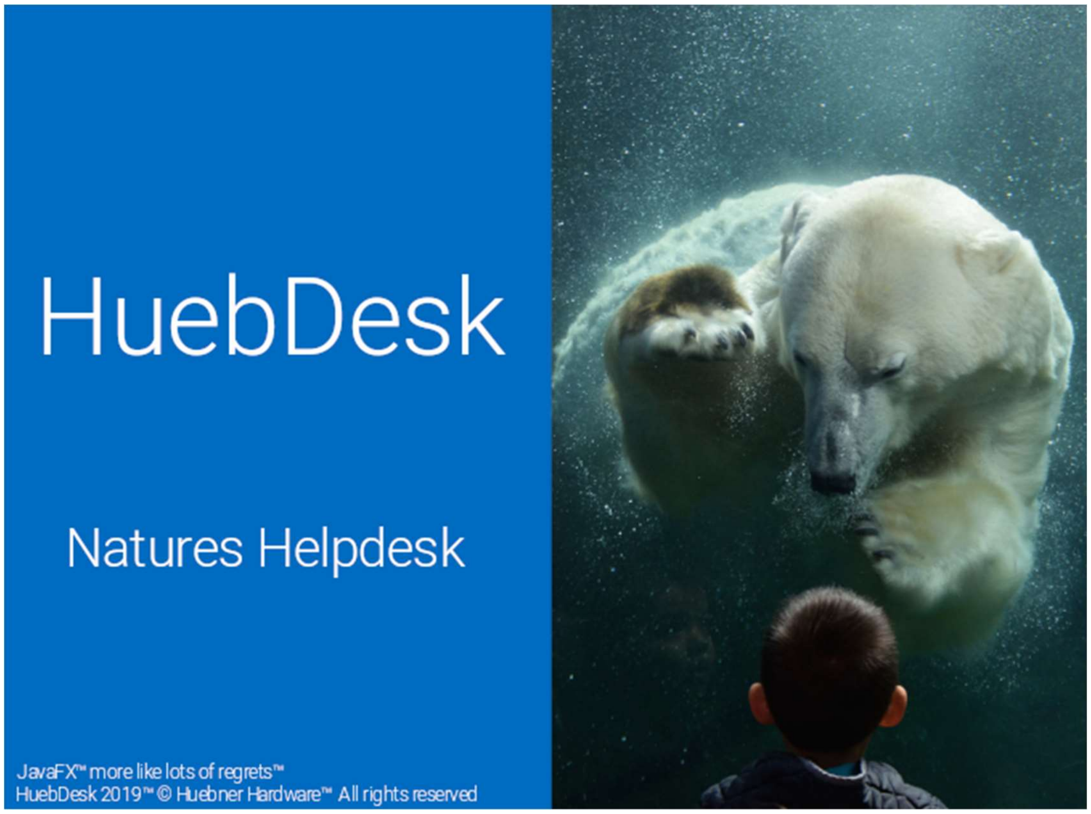
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